



2 Aug 16

Memorandum for Systems Engineering Analysis Cohort 25 (SEA25)

Subj: FY2017 SEA25 Capstone Projects: Tasking and Timelines

Enclosures:

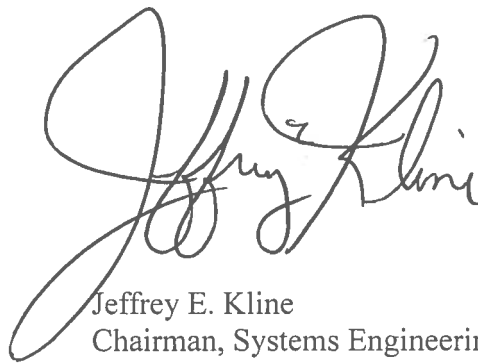
Tab A: Developing warfighting training to leverage the web fires concept and technology

Tab B: NPS Warfare Innovation Continuum “Strengthen naval power at and from the sea”

Tab C: IRB Student Checklist

1. This memorandum provides the FY2017 guidance for the conduct of the Systems Engineering Analysis (SEA) integrated project, which is required as partial fulfillment for the SEA degree. SEA students will deliver completed project reports and final briefing materials to faculty advisors in accordance with the following plan and milestones. Each group will:
 - a. Develop project proposals and management plans during the Fall Quarter AY2017. These proposals and plans will serve to focus initial research and analysis. These plans will be reviewed and updated frequently as research progresses.
 - b. Conduct project reviews approximately every six weeks, finishing with a final brief to interested stakeholders on and off campus.
 - c. Assign a report lead from each team. Work closely with faculty advisors to prepare the final reports for faculty advisor signature by four work-weeks before graduation. The final reports are then due to the SEA chairman one week later; and to the Operations Research and Systems Engineering department chairmen one week before graduation.
2. SEA students are expected to identify and integrate students and faculty from across the campus – and also from outside NPS – to participate directly in the project or to provide source documents, technical knowledge and insights, and knowledge of evolving requirements, capabilities, and systems. This participation could include students who would join project groups; students doing related individual thesis topics from TSSE, TDSI, OR, IS or SE; faculty inside or outside NPS who have expertise related to the project; and appropriately engaged government agencies and industry developers. It is the students’ responsibility to integrate the efforts of outside participants in the projects. Faculty advisors and the SEA Chair will, of course, significantly assist in these efforts.
3. Prior to commencing the formalized systems engineering and analysis process including stakeholder analysis, the SEA team will consult with Dr. Larry Shattuck, Chairman of the NPS Institutional Review Board and submit to him TAB A, a general description of the team’s systems and analytical approach to address the tasking, a completed IRB student research form (Tab C) and a list of candidate questions for stakeholders to review. The intent is to ensure questions are oriented about the “what” of the systems and not about the “who” of the stakeholder.

4. The analysis will employ the systems engineering and operations research methodologies presented in class work and from the project advisors. The role of the SEA students is that of the lead project systems engineering team, working closely with other members of the project engineering teams from TDSI and other campus curricula. SEA students will be expected to define the functions and performance of systems, develop alternative architectures to meet those functions, and evaluate the alternative architectures for performance and cost. In executing these tasks, students will be defining and understanding the overall project requirements, recognizing that the definition process is iterative and will evolve as the project progresses.
5. Grades are assigned to the participants in these projects. Although work is performed as part of a team, individual performance will be the basis for this evaluation. Successful completion and documentation of the project is a degree requirement.
6. The SEA25 project will build on, possibly challenge, but not replicate, other DOD and SEA projects. SEA25 will examine virtual environment technologies for potential contributions to establish effective training in web fires tactics and employment. SEA25 will coordinate their study efforts, participate and occupy leadership roles in other FY16/17 efforts at NPS aimed at strengthening naval power at and from the sea. These activities, coordinated by the Chair of Systems Engineering Analysis are described in Tab B.



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TAB A

SEA 25 Tasking

Developing warfighting training to leverage web fires concepts and technologies.

Design a fleet system of systems and concept of operations for employment of a cost effective training system capable of preparing naval warfighters to employ and leverage the web fires concepts and technologies in the 2025-2030 timeframe. Consider training across warfare specialties and missions. Conduct research to provide a solid foundation of knowledge requirements for a web fires fleet concept. Then complete a gap analysis by comparing current fleet training with the required training to leverage cross domain and cross-platform capabilities in a warfighting environment. Scan for current examples of cross-domain training and current training simulation from DoD and industry. Develop a system architecture addressing responsible command, training requirements, training and exercise venues, and training participants to fill discovered gaps in meeting the knowledge requirements. Assess the proposed system against the principles of high velocity learning found in the CNO's "A Design for Maintaining Maritime Superiority"

Advisors:

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TBD, Systems Engineering Department
Dr. Michael Atkinson, Operations Research Department

On Campus Subject Matter Experts:

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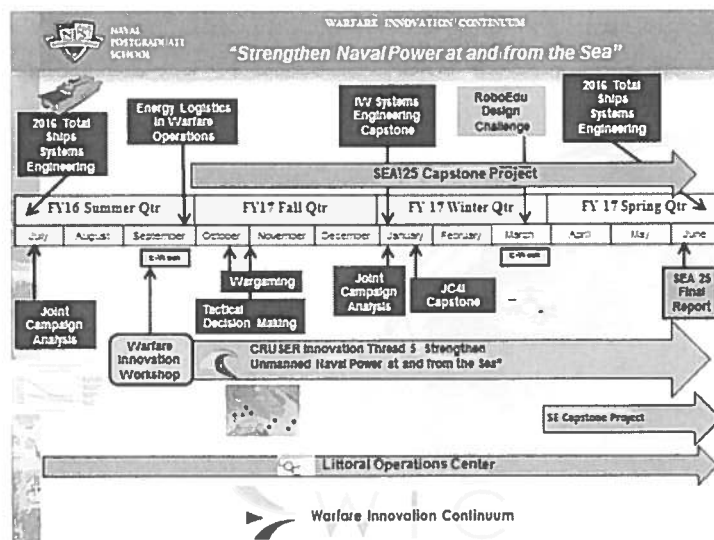
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TAB B

NPS Warfare Innovation Continuum
A Coordinated Naval Postgraduate School Cross-Campus Project FY16-17
“Strengthen naval power at and from the Sea”

Purpose: Coordinate and execute a series of cross-campus educational and research activities synchronized by the Chair of Systems Engineering Analysis with a central theme of exploring innovations to strengthen naval power at and from the sea per the CNO’s A Design for Maintaining Maritime Superiority. A primary objective is to further emerging technologies integration into fleet operations and explore alternative fleet designs and concepts to integrate manned and unmanned platforms. Focus will be to further advance and ingrain information warfare including developing the Electromagnetic Maneuver Warfare (EMW) concept by extending research in electronic warfare, spectrum management, assured C2, integrating planning and web fires, and training systems to support employment of these technologies.

Background: Emerging technologies in unmanned systems; autonomy; missile systems; undersea systems; long-range, netted and multi-domain sensors; and networks create a new environment for operations on and over the sea. This changing technology environment both challenges traditional fleet operations and provides opportunities for innovative tactics, techniques, and procedures to achieve naval objectives in sea control, power projection and counter Anti-Access Area Denial (A2AD) strategies. The NPS Warfare Innovation Continuum is a series of independent, but coordinated cross-campus educational and research activities to provide insight into the opportunities for warfighting in the complex and electromagnetically contested environment at sea and near the sea-land interface. It will address opportunities in unmanned systems technologies to support web fires and tactically offensive operations, and further develop the concept of electromagnetic maneuver warfare as an asymmetric advantage. The larger research question is **“Will emergent technologies innovatively employed strengthen naval capabilities in contested environments?”**



TAB C

IRP Student Research Check list is found at:

http://my.nps.edu/documents/103449465/105822173/IRB_Student_Research_Checklist.pdf/4fe273c8-af1f-42e8-9d72-5a750f3736df